IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	:	
Wang et al.	:	
Application No. 10/669,263	:	Art Unit: 1764
Filed: Sep 25, 2003	:	Examiner: Basia Ridley
For: CATALYSTS REACTORS AND METHODS OF PRODUCING HYDROGEN VIA THE WATER-GAS SHIFT REACTION	:	Atty Docket: 12859B-DIV

DECLARATION PURSUANT TO 37 CFR § 1.132

1. I, Jianli Hu, am knowledgeable about catalyst compositions, methods of making catalysts, and methods of catalytic alcohol steam reforming. My educational background includes a B.S degree in Chemistry, and a Ph.D. degree in Chemical Engineering. My experience includes research and development work for British Petroleum Corp and my currently work at Pacific Northwest National Laboratories which is managed by Battelle Memorial Institute. I am specialized in catalysis and reaction engineering research. My 16 years R&D experience has resulted in a total of 14 issued/pending U.S patents, and more than 60 publications in scientific journals and conferences. All of these publications are related to catalysis and reaction engineering research. For more than 7 years, one of my research focus areas is hydrogen production via alkane dehydrogenation in the presence of steam. Currently, I am managing a project related to developing structured catalysts and reactor technologies for fuel steam reforming.

2. The catalysts made in the examples of the captioned application were calcined in air at

350 °C and reduced in H_2 at 110 °C. In contrast, the catalysts in U.S. Patent No. 3,461,183 were calcined at 850 °F (450 °C) and reduced in H_2 at 1000 °F (540 °C). These are significantly different conditions and would be expected to produce Ru/K/support catalysts having different properties, even if the catalysts had the same elemental composition. Therefore, I would not expect a catalyst, synthesized in the manner described in U.S. Patent No. 3,461,183, to inherently possess any of the following properties:

a) being characterizable by a test in which the catalyst is placed in a reaction chamber and contacted with a reactant gas mixture containing 8% CO, 7% CO_2, 38% H_2, and 47% H_2O, at a contact time of 50 ms and a temperature of 325 EC, resulting in greater than 70% CO conversion and at least 80% CO_2 selectivity;

b) being characterizable by a test in which the catalyst is placed in a reaction chamber and contacted with a reactant gas mixture containing 8% CO, 7% CO_2, 38% H_2, and 47% H_2O, at a contact time of 25 ms and a temperature of 420 EC, resulting in greater than 70% CO conversion and at least 80% CO_2 selectivity;

c) being characterizable by a test in which the catalyst is placed in a reaction chamber and contacted with a reactant gas mixture containing 8% CO, 7% CO_2, 38% H_2, and 47% H_2O, at a contact time of 50 ms and a temperature of 325 EC, resulting 70 to 85% CO conversion and 80-95% CO_2 selectivity.

d) being characterizable by a test in which the catalyst is placed in a reaction chamber and contacted with a reactant gas mixture containing 8% CO, 7% CO_2, 38% H_2, and 47% H_2O, at a contact time of 25 ms and a temperature of 420 EC, resulting in 70 to 85% CO conversion and at least 80% CO_2 selectivity; or

e) being characterizable by a test in which the catalyst is placed in a reaction chamber and contacted with a reactant gas mixture containing 8% CO, 7% CO_2, 38% H_2, and 47% H_2O, at a contact time of 25 ms and a temperature of 420 EC, resulting in 70 to 85% CO conversion and at least 85% CO_2 selectivity.

More specifically, I would expect the higher synthesis temperatures to result in a catalyst with lower activity.

3. Workers in the field know well that different methods of making a catalyst can produce catalysts with very different properties, even though the elemental composition is the same. Attached to this Declaration is an article from *219th American Chemical Society meeting, March 2000.* In this article, all five Co/SiO_2 catalysts have the same composition (5% Co 95%SiO_2) and the same structure (Co supported SiO_2). However, due to the difference in method of making, their final catalytic activities are completely different, some catalysts are even inactive (see Table 2 in the article). In summary, the methods of making and activation procedure can change the property of catalysts having the same composition.

4. The attached article shows examples with Co/SiO_2 catalysts. This article is just one example of the well known fact that the methods of making and activation procedure for a catalyst change the properties of catalysts, even where the catalysts have the same elemental composition. Workers skilled in the field of catalyst technology know that this is a general concept and is not limited to Co/SiO_2 catalysts. The concept that methods of making and activation procedure for a catalyst change the properties of catalysts applies equally to Ru-based catalysts.

5. I declare that all of the above statements made of my own knowledge are true and all statements made on information and belief are believed to be true. I understand that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. §1001), and may jeopardize the validity of the application or any patent issuing thereon.

Date: June 15, 2007

By: ______________________
Jianli Hu